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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,905	06/26/2001	Gwan-Byeob Koh	5649-873	1424

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EXAMINER

GEBREMARIAM, SAMUEL A

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 04/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/891,905

Applicant(s)

KOH ET AL.

Examiner

Samuel A Gebremariam

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 7-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of group II, claims 1-4 and 7-16 drawn to a method of making semiconductor device in Paper No. 5 is acknowledged.
2. Applicant's cancellation without traverse of claims 5 and 6 in Paper No. 5 is acknowledged.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of claim 2 is unclear because first level of ions, second level of ions is not clear as to what level is referring to. Is it depth, implant energy or concentration?

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. Claims 1 and 2, are rejected under 35 U.S.C. 102(e) as being anticipated by Odate US patent No. 6,165,825.

Regarding claim 1, Otake teaches a method of forming a channel region between isolation regions of an integrated circuit substrate, the method comprising; forming a mask Pr21 on the isolation region 2 that extends onto a portion of the substrate adjacent to the isolation region to provide a shielded portion of the substrate adjacent to the isolation region and an exposed portion of the substrate spaced apart from the isolation region having the shielded portion in between and forming a channel region 10 in the exposed portion of the substrate (fig. 5a-5f).

Regarding claim 2, insofar as in compliance with 35 USC 112 Otake teaches the entire claimed process of claim 1 above including forming the channel region comprises; implanting a first level of ions in the shielded region adjacent to the isolation region and implanting a second level of ions in the channel region spaced apart from the isolation region where the second level is greater than the first level (fig. 5a-5f and column 11, lines 52-64).

Claims 7-16, are rejected under 35 U.S.C. 102(e) as being anticipated by Sung et al. US patent No. 6,008,085.

Regarding claim 7, Sung teaches a method of manufacturing a integrated circuit memory device comprising the steps of: defining an active region comprising a first portion where a gate electrode is formed, a second portion where a bit line contact is formed and a third portion where a storage node contact of a capacitor is formed on a integrated circuit substrate; and ion-implanting a dopant of first conductive type into the active region on the integrated circuit substrate using a mask pattern exposing only the first and second portions of the active region as ion-implantation mask, thereby forming

a channel ion-implantation region in only the first and second portions (figs. 1-9, column 3, lines 25-67 and column 4, lines 1-63).

Regarding claim 8, Sung teaches the entire claimed process of claim 7 above including the first portion comprises two regions where the second portion is located between the two regions, allowing gate electrodes 10 to be formed adjacent to both sides of the second portion (fig. 6).

Regarding claim 9, Sung teaches the entire claimed process of claim 7 above including the mask pattern is formed of photoresist film (column 3, lines 43-67).

Regarding claim 10, Sung teaches the entire claimed process of claim 7 above including the first conductive type is p-type (column 3, lines 43-67).

Regarding claim 11, Sung teaches the entire claimed process of claim 7 above including the method of claim 7 further comprising forming a gate electrode 10 on the first portion of the active region, forming first and second source/drain regions 20 in the second and third portions of the active region respectively using ion-implanting of a dopant of a second conductive type opposite to the first conductive type into the second and third portion and forming a first contact plug 17a self-aligned to the gate electrode and connected to the first source/drain region and forming a second contact plug 17b self-aligned to the gate electrode and connected to the second source/drain region (fig. 6).

Regarding claim 12, Sung teaches the entire claimed process of claim 7 above including the first portion comprises two adjacent regions having the second portion in between where the gate electrodes 10 are formed on the adjacent regions (fig. 6).

Regarding claim 13, Sung teaches the entire claimed process of claim 7 above including the first contact plug 17a connects the first source/drain region to a bit line (fig. 6).

Regarding claims 14 and 15, Sung teaches the entire claimed process of claim 7 above according to 12 including the third portion in the active region comprises two regions on opposite sides of the second portion at the outside of the two regions of the first portion where the second contact plug 17 connects the second source/drain region in the third portion to a storage node of a capacitor (fig. 6).

Regarding claim 16, Sung teaches the entire claimed process of claim 7 above including the second conductive type is an n-type (column 4, lines 47-62).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 4, are rejected under 35 U.S.C. 103(a) as being unpatentable over Odake in view of Lee et al. US patent No. 6,

Regarding claim 3, Odake teaches substantially the entire claimed process of claim 1 above except explicitly stating implanting boron difluoride ions in the exposed region.

Odake teaches implanting B<sup>+</sup> ions twice by varying the implant energy and concentration (fig. 5a-5f).

It would have been well within ordinary skill in the art at the time the invention was made using the heavier boron difluoride instead of boron ions is widely known in the art to reduce short channeling effect.

Regarding claim 4, Otake teaches substantially the entire claimed process of claim 1 above except explicitly stating forming a contact on the shielded region.

It is conventional to form contact on the shielded region where the source/drain region is formed. It would have been obvious to one of ordinary skill in art at the time the invention was made to form contact on the shielded region where connection to source/drain is to be made in order to communicate to other part of the integrated circuit device.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References C and D are cited as being related to fabrication of DRAM.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Admassu Gebremariam whose telephone number is 703 305 1913. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Samuel Admassu Gebremariam  
April 8, 2002

*Tom Thomas*

**TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800**